Cheryl Watson's Hard Truths on SW Pricing

Session 23716, August 14, 2018

Cheryl Watson, Frank Kyne

www.watsonwalker.com

technical@watsonwalker.com

Welcome!

- Thanks for joining us today.

- Who are we?
    - Watson & Walker was founded in 1988 (30 year's ago!) by Cheryl Watson and Tom Walker.
    - Famous for Cheryl Watson's Tuning Letter, Cheryl's WLM Quickstart policy, Cheryl's performance classes, and especially for Cheryl's integrity and commitment to her customers.

- More recently, in response to customer requests to help them understand their SW bills and manage their costs, we have combined our technical skills with Cheryl's alter-ego - Cheryl the accountant.

Bias

- There are now 10 of us in Watson and Walker Transgalactic Plc Ltd, 6 of whom are here at SHARE:
    - Cheryl Watson – Cheryl is ….. Cheryl, what more do I need to say?
    - Tom Walker – Ex-GE, ex-ITT, non-IBM programmer and software designer since 1965; Cheryl says that Tom has the patience of a saint being married to her. ☺
    - Brenda White – Ex-IBM, ex-CA, last 20 years working on software pricing, offerings, contracts, described by Cheryl as her "long-lost daughter".
    - Mario Bezzi – Ex-IBM Italy, ex-Redbooks project leader, pre- and post-sales tech support for IBM Italy's largest z/OS customers, programmer-extraordinaire.
    - Alan Murphy – Ex-IBM Ireland, z/OS sysprog, middleware, networking, global chief architect and SW pricing and contract specialist for Z in IBM Outsourcing division.
    - Frank Kyne – Ex-IBM, ex-Redbooks project leader, editor of Cheryl Watson's Tuning Letter, W&W official chauffeur and Irish joke teller…

What Is SCRTPro?

- There are a variety of nice tools and products available that analyze your SMF data to show MSU usage, what is running where, and so on.

- However, SCRTPro is *not* a tool – it is a monthly consulting service that provides access to the insights and experiences of the Watson & Walker team. *Our* job is to stay abreast of the latest technology and pricing options that can reduce your cost per transaction, and apply that knowledge to whatever is driving *your* software costs:
  - Which of the plethora of IBM pricing options are the right fit for *your* environment and applications?
  - When is the right time to move to CMP?
  - Would one of the Container Pricing options be right for you?
  - Are you prepared for a software audit (a growing source of revenue for some companies)? We can help you with advice and tools.
  - Who reviews your software contracts? Do they understand SMF and MSUs and MIPS and R4HA and LPARs and SCRT reports? We do.
  - How do you know if your IBM software bill is accurate? We can tell you what it *should be*, accurate to 1 cent, *before* you send the SCRT report to IBM.

What Is SCRTPro?

- What does the offering provide:
  - Every month, you send us your SCRT data
    - We process the data, determine if there are any anomalies, check if there are any intervals that maybe should be excluded, and provide a report showing your expected costs by product.
    - This is completed within a couple of days, giving you a chance to review/investigate before sending the SCRT report to IBM.
  - Later in the month, we provide a report and web conference to discuss:
    - Trends
    - Track planned against actual costs
    - Discuss recent SW pricing-related announcements and how they could impact/benefit you
    - Discuss where to go next to reduce your costs/improve flexibility
    - Answer your "What if" questions

Introduction to software pricing

- Is software pricing *really* as complicated as everyone says?
  - Sadly, yes. (But, this is NOT unique to z/OS – more later)
- *Why* is it so complicated?
  - Because Wall St. demands that IBM:
    1. Grows
    2. Does not reduce its mainframe software revenue stream
- The only way to achieve these conflicting objectives is to have different prices for different workloads.
  - "Legacy" applications pay full price.
  - "New" applications get a discounted price to make z/OS competitive with other platforms.
- The mainframe has 25+ years of baggage that we can't just eject:
  - Over those years, IBM has introduced *dozens* of software pricing options, intended to encourage customers to behave in a certain way (e.g. PSLC, Mobile Workload Pricing).
  - And customers have *very large software budgets*. Neither IBM nor customers could handle the chaos of just throwing it all away and starting from scratch.

The basics of software billing

- Different payment models:
  - Some software is effectively rented (Monthly License Charge).
  - Some software is licensed up front & support is paid for each month (OTC or IPLA + S&S).
- Different basis for billing:
  - The bill for *some* software has a relationship to peak CPU consumption of the LPARs that the product ran in ('sub-capacity') during the previous month.
  - The bill for *some* products is based on the capacity of the CPC ('full capacity').
  - The bill for *some* products is based on the peak CPU consumption of the LPARs that a *different* product is running in ('reference-based').
  - The bill for *some* software is fixed, regardless of CPU consumption (within bounds – DevTest container).
  - Is the product in a CPC that qualifies for (the dreaded) sysplex aggregation?
  - But there IS some good (?) news - work that runs on a zIIP or zEDC is not counted towards your bill!
- All of these products very likely run in the same LPAR!

The basics of software billing

- To encourage particular behaviors, IBM offers nearly 30 pricing options – *some* examples are:
    - MWP reduces your *MSU*s (NOT your bill!) by **60**% of the capacity used by a certain subset of transactions.
    - zCAP reduces the MSU value for *some* products by **100**% and z/OS MSUs by **50**% of the MSUs used by a different subset of transactions.
    - CMP calculates your MSU consumption in a different way than non-CMP, then applies an '**adjustment**' to bring the bill back to the original amount.
    - zNALC and MzNALC charge a very reduced rate for z/OS MSUs, but you must have dedicated LPARs for the qualifying workloads and major subsystems *must* use IPLA versions for the work running in the NALC LPARs.
    - IBM offers a discount (Technology Update Pricing) depending on the type of CPC you are running on and your number of installed MSUs.
    - The DevTest Container Solution **fixes the cost** of your DevTest workload at today's level, as long as it doesn't exceed an agreed number of MSUs – *but* you have to pay for that number of MSU's worth of Value Units NOW for any IPLA products in the container.

The basics of software billing

- IF you understand the software pricing options, the available technology options, and you have the right tools to perform analysis and modeling, it IS possible to use all of these to your advantage.

- It doesn't matter if your corporate strategy is to move everything to the cloud - why would you spend any more than necessary between now and then?

- Let's look at one real life example…..

Effect of Exploiting Available Options
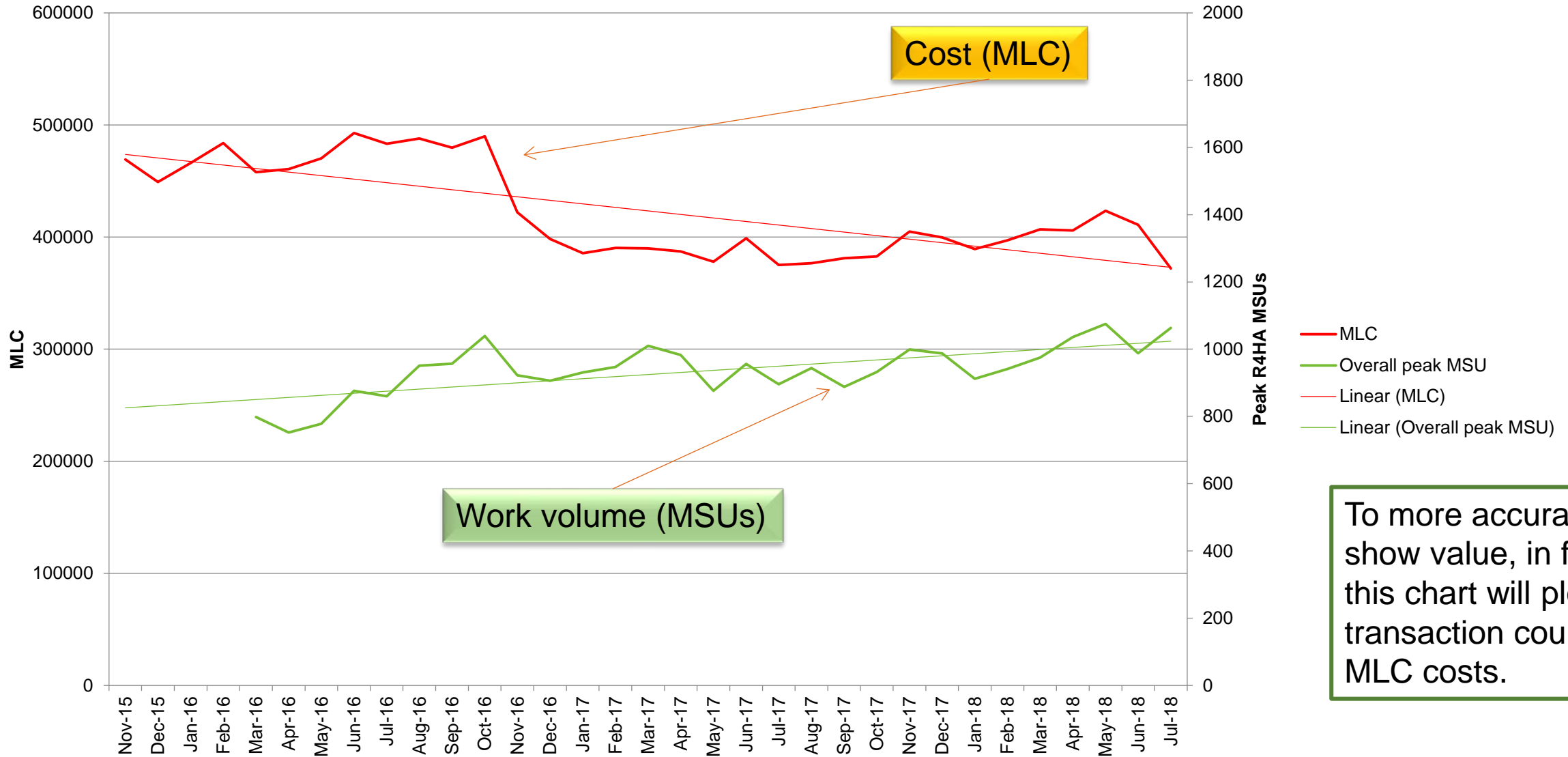
To more accurately show value, in future this chart will plot transaction counts vs MLC costs.

Tuning your software costs

- So how do *you* reduce your software bill?
  - We often see people doing really outstanding work to reduce CPU consumption, based on years of experience with performance and knowledge of their workloads.
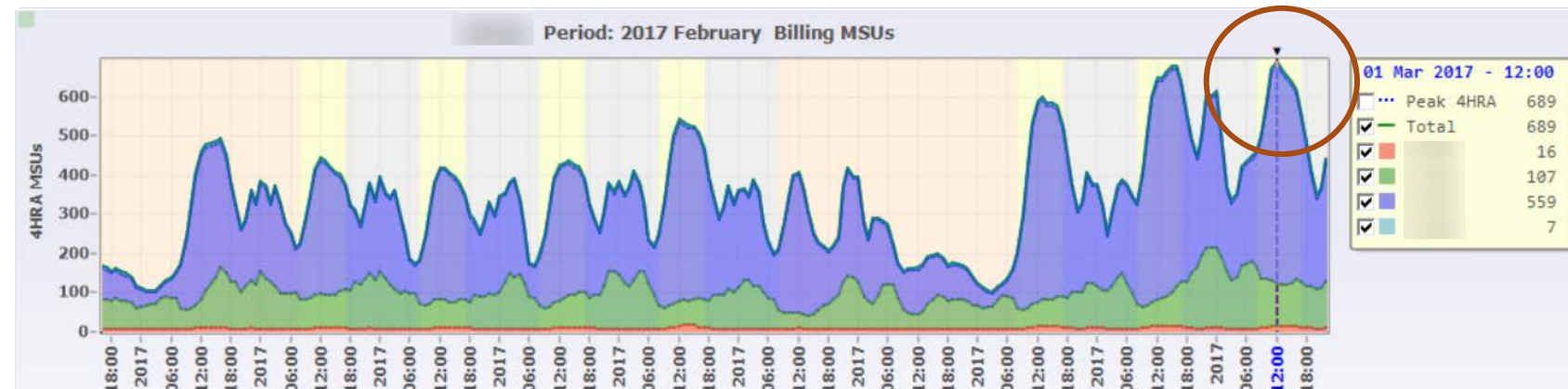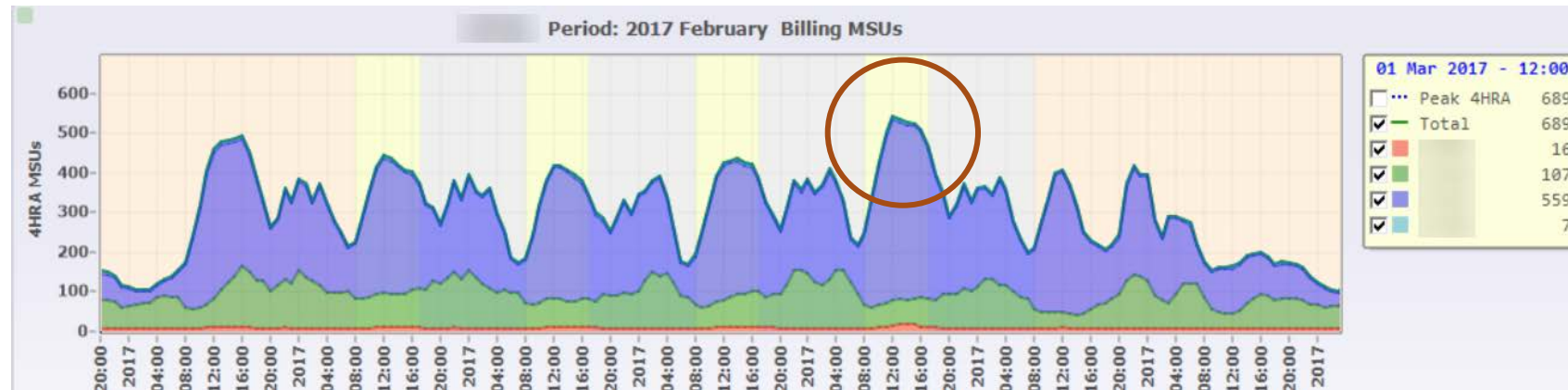

But if you don't target the <u>right</u> interval, all your hard work won't save a penny.

Tuning your software costs

- To reduce your software bill, you need to go after the right interval. Which is the 'right' interval?
  - The Peak interval!
- *Which* Peak interval?
  - The highest one (DUH!).
- Highest one for *which product*?
  - Huh?

- Remember that your bill is the aggregation of the costs *for each product you have*. People talk about tuning the peak R4HA interval as if it was one interval. But *each product* can have a *different peak R4HA*, especially if you have a complex LPAR configuration.
- PLUS, if you are using any of the pricing options, your peak actual R4HA might NOT be the peak that drives your bill.
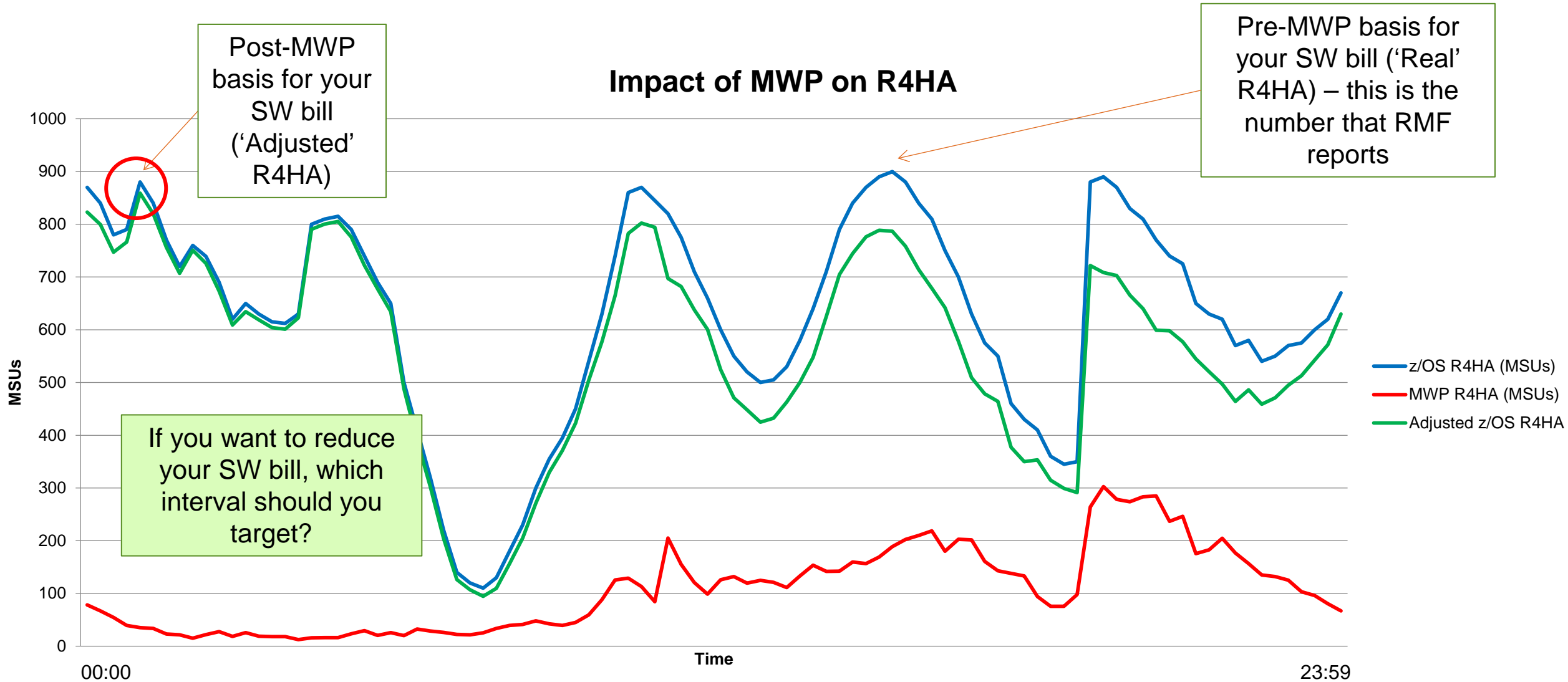
Who/What/When do I tune?

- If you want to be effective at reducing your SW bill, you MUST understand where the real *costs* are. Most techies understand MIPS and MSUs, but have no clue about costs.

- This is a sample, artificial, SCRTPro report for a customer with a typical mix of products and around 2500-3000 MSUs:

A	B	C	D	E	F	G	H	I	J	K	L
MLC Summary for PricePlex ==>	ALL_PLEXES	$ 3,218, 626			Nov 2016	Dec 2016	Jan 2017	Feb 2017			
CPC Highest 4HRA MSUs [SCRT Sect N5]					2463	2522	2957	2581			
MLC Products	Product ID	Lic Type	Lic Ref	In SCRT	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Period Total	Monthly Avg	MLC Perc
					$ 770,853.33	$ 779,963.47	$ 872,256.90	$ 795,552.73	$ 3,218,626.43	$ 804,656.61	100.0%
z/OS V2 (Traditional)	5650-ZOS	AWLC	LPAR	Yes	$ 230,824.62	$ 233,157.16	$ 250,354.69	$ 235,489.70	$ 949,826.16	$ 237,456.54	29.5%
z/OS V2 DFSMS dsshsm	5650-ZOS	AWLC	z/OS	No	$ 20,632.65	$ 20,878.01	$ 22,687.02	$ 21,123.37	$ 85,321.06	$ 21,330.26	2.7%
z/OS V2 DFSMS rmm	5650-ZOS	AWLC	z/OS	No	$ 10,089.03	$ 10,211.71	$ 11,116.21	$ 10,334.39	$ 41,751.33	$ 10,437.83	1.3%
z/OS V2 DFSORT	5650-ZOS	AWLC	z/OS	No	$ 3,311.49	$ 3,372.56	$ 3,822.82	$ 3,433.63	$ 13,940.48	$ 3,485.12	0.4%
z/OS V2 SDSF	5650-ZOS	AWLC	z/OS	No	$ 5,992.71	$ 6,063.51	$ 6,585.49	$ 6,134.31	$ 24,776.01	$ 6,194.00	0.8%
z/OS V2 C/C++ without Debug	5650-ZOS	AWLC	z/OS	No	$ 6,315.43	$ 6,429.89	$ 7,518.26	$ 6,471.51	$ 26,735.09	$ 6,683.77	0.8%
z/OS V2 Infoprint Server	5650-ZOS	AWLC	z/OS	No	$ 5,088.87	$ 4,926.44	$ 5,273.16	$ 5,170.08	$ 20,458.54	$ 5,114.63	0.6%
non-z/OS (AWLC)											
CICS TS for z/OS V5	5655-Y04	AWLC	LPAR	Yes	$ 201,593.52	$ 205,490.59	$ 233,084.33	$ 209,576.22	$ 849,744.66	$ 212,436.16	26.4%
DB2 11 for z/OS	5615-DB2	AWLC	LPAR	Yes	$ 177,552.62	$ 181,002.74	$ 205,431.77	$ 184,619.79	$ 748,606.92	$ 187,151.73	23.3%
IBM MQ for z/OS V8	5655-W97	AWLC	LPAR	Yes	$ 86,410.80	$ 85,379.43	$ 101,144.66	$ 89,357.57	$ 362,292.45	$ 90,573.11	11.3%
WebSphere MQ for z/OS V7	5655-R36	AWLC	LPAR	Yes							

- We use this information to identify your expensive products. Then we identify the interval that corresponds to that price. And THAT is the interval you should tune.

The basics of software billing

- How do you identify the interval that corresponds to that cost?
  - You need a tool that understands both Actual MSUs and Billing MSUs, and can report both values at the product level, bearing in mind pricing options such as Container Pricing. This is a sample report from SCRTPro.
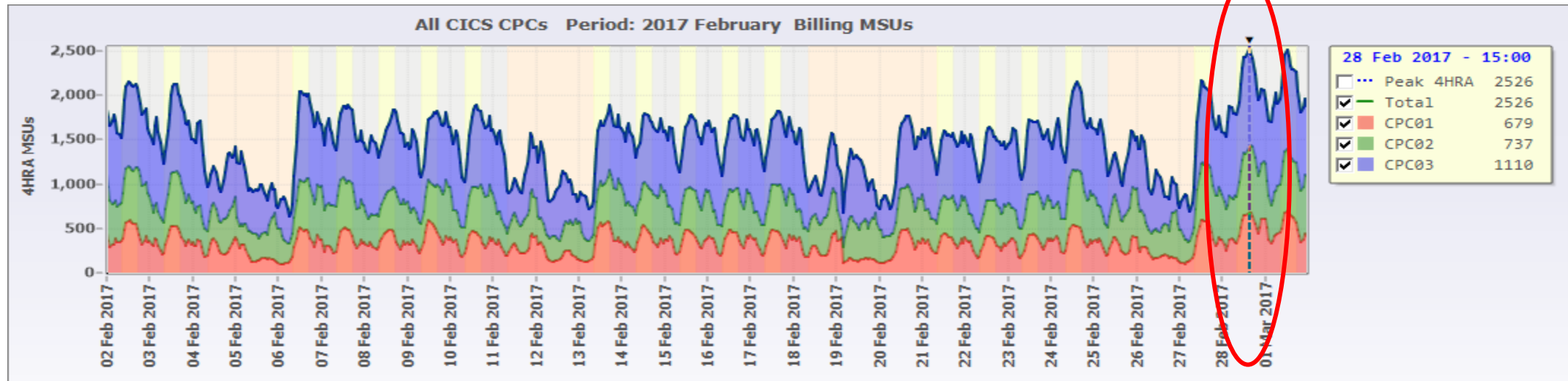
  - With knowledge of your costs and which interval is driving your bill, you then drill down to see what happened during that peak. Then apply the most appropriate solution (this is CICS, so maybe MWP?) to reduce that cost.

Who likes wasting money?

- Just about all customers have some sort of Enterprise License Agreement with IBM and other vendors.

- Depending on the type of agreement you have, any over-payments you make might be available to put towards other (specified) software, hardware(?), or services purchases. But, if you don't use it, you might lose it.

- On the other hand, if your actual bills for the year exceed the projected amount, IBM and others will kindly send you a lovely present – an invoice for the shortfall.

- So, one of your objectives should be to track your actual usage against your scheduled payments (called CBA).

Who likes wasting money?

- One of the standard monthly reports for SCRTPro customers is a chart showing actual bills against the CBA.

Actual vs Projected MLC Costs

Legend:
- CBA
- Actual MLC
- ELA Balance
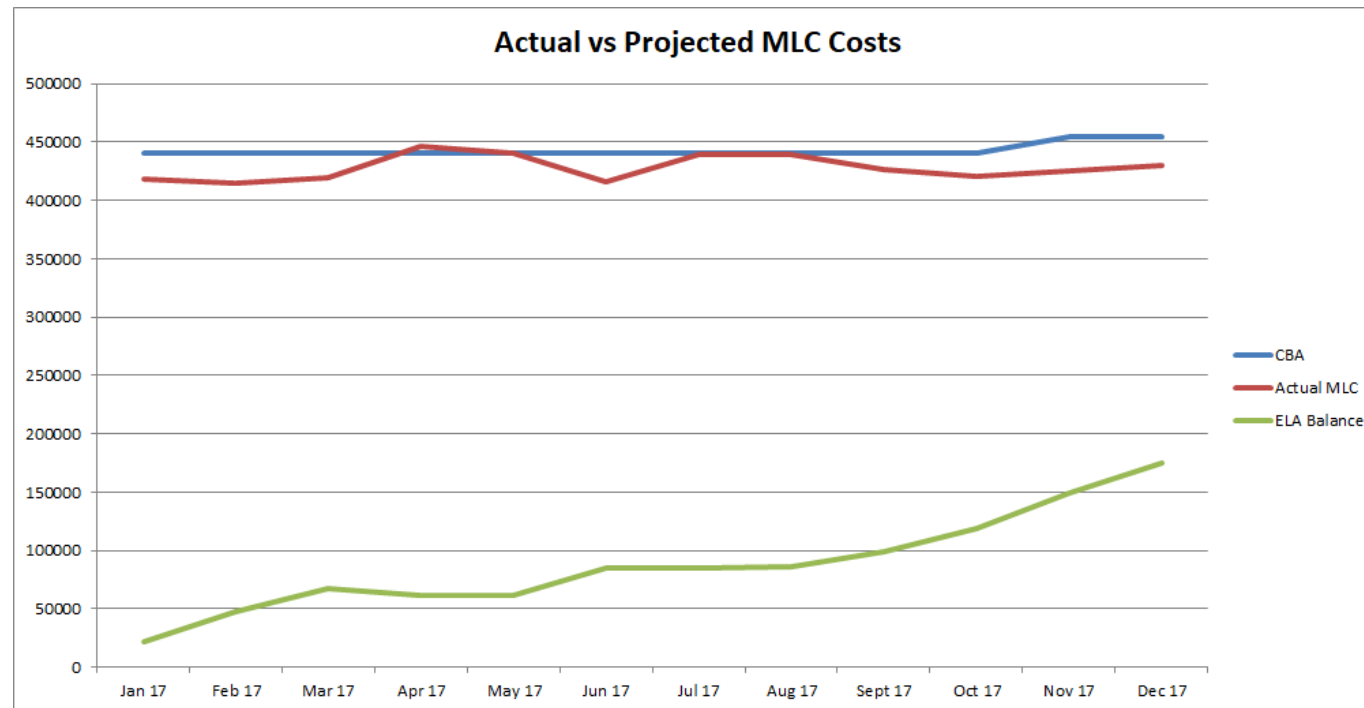
- If your usage is *ahead* of plan, you might want to increase capping to avoid an unexpected bill.
- If you are in *credit*, you want to make sure that you use the credit for any applicable purchases, rather than 'real money', so you need to know your balance and any planned purchases.
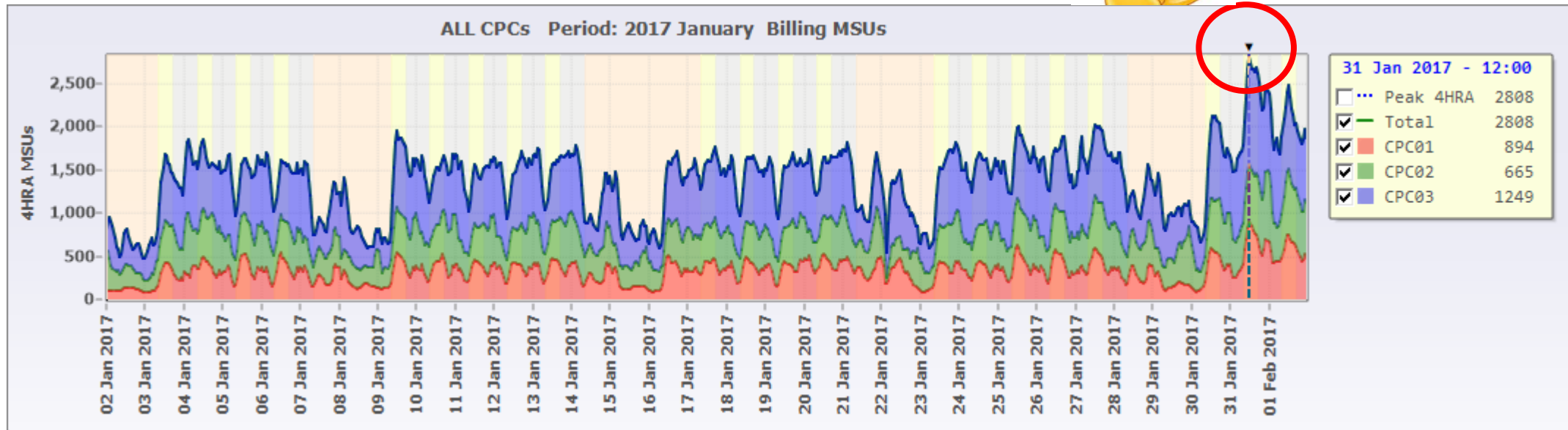
Don't miss the boat

- There are certain situations where IBM will allow you to exclude one or more intervals from your SCRT reports – see the SCRT User's Guide.
  - You obviously are expected to be honest and responsible.
- But if you have an allowed situation, you should EXCLUDE the particular interval(s) and LPAR(s) in the SCRT report you send IBM:
  - IF you discover the problem AFTER you submit the report to IBM, it will be MUCH harder to get agreement to re-submit your report and exclude those intervals.
- The earliest you can create the SCRT report is on the 2nd of the month, and you must submit it to IBM by the 9th. This doesn't give you a lot of time to identify and investigate any anomalous intervals.
- If you keep excluding LPARs, you will become the boy that cried 'Wolf!', and IBM will not be inclined to accept your excludes. So, you need to be sure that if you are going to exclude an interval, that it will make a difference to your bill.

Don't miss the boat

- As soon as you send us (W&W) your SCRT reports, we will review your R4HAs:
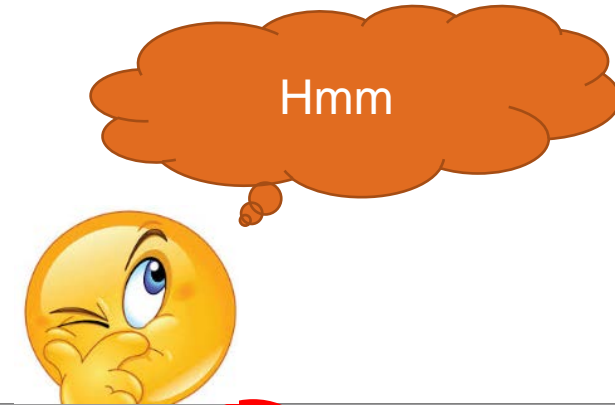
Don't miss the boat

- How much did this spike cost?

A	B	C	D	E	F	G	H	I
MLC Summary for PricePlex ==>	ALL_PLEXES	$ 3,218, 626			Nov 2016	Dec 2016	Jan 2017	Feb 2017
CPC Highest 4HRA MSUs [SCRT Sect N5]					2463	2522	2957	2581
MLC Products	Product ID	Lic Type	Lic Ref	In SCRT	Nov 2016	Dec 2016	Jan 2017	Feb 2017
					$ 770,853.33	$ 779,963.47	$ 872,256.90	$ 795,552.73
z/OS V2 (Traditional)	5650-ZOS	AWLC	LPAR	Yes	$ 230,824.62	$ 233,157.16	$ 250,354.69	$ 235,489.70
z/OS V2 DFSMS dsshsm	5650-ZOS	AWLC	z/OS	No	$ 20,632.65	$ 20,878.01	$ 22,687.02	$ 21,123.37
z/OS V2 DFSMS rmm	5650-ZOS	AWLC	z/OS	No	$ 10,089.03	$ 10,211.71	$ 11,116.21	$ 10,334.39
z/OS V2 DFSORT	5650-ZOS	AWLC	z/OS	No	$ 3,311.49	$ 3,372.56	$ 3,822.82	$ 3,433.63
z/OS V2 SDSF	5650-ZOS	AWLC	z/OS	No	$ 5,992.71	$ 6,063.51	$ 6,585.49	$ 6,134.31

- Give or take, about 100K. We can determine the precise cost, but this interval is certainly worth investigating BEFORE you submit SCRT report to IBM.
  - The MSU Analyzer helps identify which intervals in which LPARs were anomalous.
  - You'll have some time to determine if this was a problem because of a newly applied maintenance, a recovery after an outage, a looping program, or another unusual problem.

Country Multiplex Pricing

- Let's look at a scenario that many customers are facing today – whether and/or when to migrate to Country Multiplex Pricing (CMP).

- CMP offers LOADs of technical benefits. To understand the benefits, we need to talk a LITTLE about how IBM calculates your bill..

Basics – Sum of the Peaks

- How IBM arrives at your (pre-CMP) monthly z/OS-based software bill:
  - DO THIS For each product:
    - For each CPC:
      - Identify the peak Rolling 4-Hour Interval (in MSUs) in the month for that product (A).
    - For each CPC or aggregated group:
   - Sum the 'A' values for that CPC or group.

	CPC1						CPC2					CPC3			AWLC SUM
	LP1	LP2	LP3	LP4	AWLC SUM		LP1	LP2	LP3	AWLC SUM		LP1	LP2	AWLC SUM	
0:00	55	232	13	563	863	0:00	217	101	392	710	0:00	148	183	331	
1:00	64	481	49	246	840	1:00	276	392	384	1052	1:00	71	62	133	
2:00	60	454	15	255	784	2:00	235	382	65	682	2:00	179	288	467	
3:00	73	279	38	342	732	3:00	166	269	202	637	3:00	348	321	669	
4:00	75	257	37	671	1040	4:00	108	218	347	673	4:00	260	115	375	
5:00	52	442	32	329	855	5:00	369	86	122	577	5:00	450	123	573	
6:00	61	415	17	172	665	6:00	315	342	123	780	6:00	241	74	315	
7:00	75	406	12	168	661	7:00	366	293	155	814	7:00	148	340	488	
8:00	66	465	12	159	702	8:00	117	64	100	281	8:00	103	363	466	
9:00	68	374	18	390	850	9:00	154	264	347	765	9:00	446	155	601	
10:00	63	350	50	571	1034	10:00	266	83	220	569	10:00	229	399	628	
11:00	66	395	22	382	865	11:00	339	120	336	795	11:00	244	373	617	
12:00	52	459	24	263	798	12:00	342	247	318	907	12:00	304	211	515	
Peak					1040					1052				669	2761

Current Restrictions

- However, while sysplex provides the *technical* ability to float and shift workloads between systems, CPCs, and even sites, the use of the peak R4HA for *each* CPC to determine your software bill can act as a financial disincentive to exploit this capability.

Daily Peak R4HA
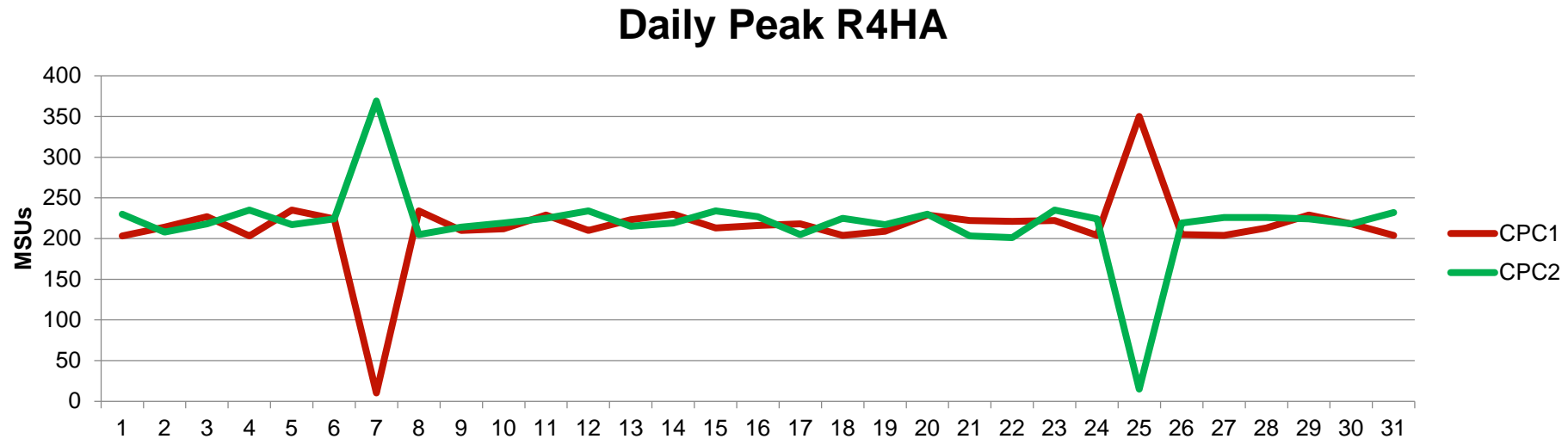
- In this example, the *combined* CPC consumption never exceeded about 460 MSUs. However, the bill for this month would be for 710 MSUs (peak of 350 MSUs for CPC1 plus 360 MSUs for CPC2).

- Another example - When doing a permanent move of a sizeable workload between CPCs, you would need to do it at 23:59 on the 1st of the month to avoid having to pay for that workload twice in that month. But that timing might not suit your business.

CMP – Peak of the Sums

- However, when using *CMP*, your peak R4HA is calculated by summing the MSUs for LPARs across ALL CPCs, not on a CPC-by-CPC basis.

- The *worst* case is that the CMP R4HA will be the same as the pre-CMP R4HA. In practice, it should nearly always be less.

AWLC SUM = 1040 + 1052 + 669 = 2761
CMP SUM = 2277

		CPC1						CPC2						CPC3			AWLC SUM	CMLC SUM
	LP1	LP2	LP3	LP4	AWLC SUM		LP1	LP2	LP3	AWLC SUM		LP1	LP2	AWLC SUM			
0:00	55	232	13	563	863	0:00	217	101	392	710	0:00	148	183	331			1904
1:00	64	481	49	246	840	1:00	276	392	384	1052	1:00	71	62	133			2025
2:00	60	454	15	255	784	2:00	235	382	65	682	2:00	179	288	467			1933
3:00	73	279	38	342	732	3:00	166	269	202	637	3:00	348	321	669			2038
4:00	75	257	37	671	1040	4:00	108	218	347	673	4:00	260	115	375			2088
5:00	52	442	32	329	855	5:00	369	86	122	577	5:00	450	123	573			2005
6:00	61	415	17	172	665	6:00	315	342	123	780	6:00	241	74	315			1760
7:00	75	406	12	168	661	7:00	366	293	155	814	7:00	148	340	488			1963
8:00	66	465	12	159	702	8:00	117	64	100	281	8:00	103	363	466			1449
9:00	68	374	18	390	850	9:00	154	264	347	765	9:00	446	155	601			2216
10:00	63	350	50	571	1034	10:00	266	83	220	569	10:00	229	399	628			2231
11:00	66	395	22	382	865	11:00	339	120	336	795	11:00	244	373	617			2277
12:00	52	459	24	263	798	12:00	342	247	318	907	12:00	304	211	515			2220
Peak					1040					1052				669		2761	2277

Copyright 2018 Watson & Walker

CMP – Peak of the Sums

- Because your peak R4HA is calculated by summing the MSUs for LPARs across ALL CPCs moving a workload from one CPC to another should have zero impact on your software bill – note that the CMP line below (blue one) is no higher on days 7 or 25, so the bill would be for 460 MSUs rather than 710 MSUs if not using CMP.
    - This means that you can now move workloads when it suits *your business*, not when it fits in with how your R4HA is calculated.
- You can also better exploit queue sharing, dynamic workload routing, perform DR tests…

Daily Peak R4HA

Copyright 2018 Watson & Walker
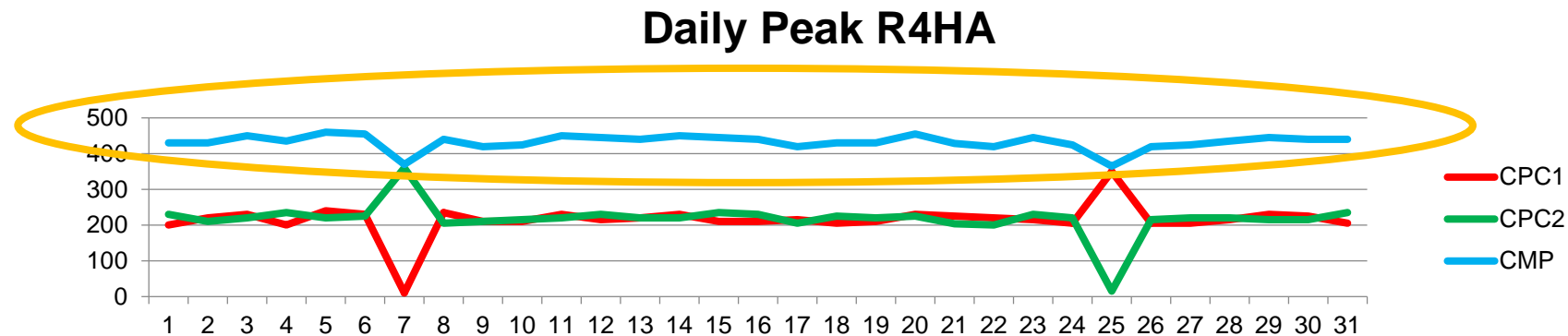
Country Multiplex Pricing

- But unlike MWP, zCAP, etc, CMP was intended to be revenue- and cost-neutral.
- To achieve this cost-neutrality, an adjustment is applied to your CMP software bill, the objective being to make sure that, *all other things being equal*, you would pay the same *after* you switch to CMP as you did *before* the switch.
  - The adjustment immediately became known as the 'CMP uplift', giving the impression that it increases your software bill – that is not the intention. But I think that this is misleading, so we try to stick with 'adjustment'.
- The adjustment is effectively a (nearly) fixed cost that *will be applied to your bill forever more.*

- If it is a fixed cost, why do we care?

Country Multiplex Pricing

Why does it matter which 3 months you use to select your base?

These are the numbers for each month for 5 months:

	Aug Base	Aug Diff	Aug Factor	Sep Base	Sep Diff	Sep Factor	Oct Base	Oct Diff	Oct Factor	Nov Base	Nov Diff	Nov Factor	Dec Base	Dec Diff	Dec Factor
z/OS	4697	121,101	41.27%	4814	120,927	40.66%	4653	117,077	40.10%	4685	119,658	39.26%	4721	126,185	41.23%
HSM	4697	9,647	35.14%	4814	9,591	34.42%	4653	9,272	33.97%	4685	9,423	33.07%	4721	10,065	35.16%
SDSF	4697	3,267	41.01%	4814	3,256	40.26%	4653	3,148	39.74%	4685	3,203	38.73%	4721	3,388	40.77%
C/C++	4252	6,581	44.35%	4814	6,518	43.19%	4164	6,466	44.04%	4143	6,706	44.02%	4147	7,121	46.72%
RMF	4697	5,483	35.79%	4814	5,465	35.19%	4653	5,297	34.75%	4685	5,395	33.90%	4721	5,752	35.99%
CICS V5	4262	66,488	22.93%	4260	71,361	24.62%	4148	72,031	25.37%	4252	75,216	24.99%	4367	77,335	25.16%
DB2	4262	58,092	22.70%	4260	62,399	24.40%	4145	63,030	25.18%	4249	65,830	24.80%	4364	67,724	24.98%
Cobol V4	639	2,777	25.93%	673	2,051	18.58%	758	1,277	10.77%	786	604	4.79%	788	423	3.34%
Total	4697	273,436	29.94%	4814	281,569	30.65%	4653	277,598	30.79%	4685	286,036	30.11%	4721	297,993	30.93%
Diff Max/Min of Diff		24,556													
Diff Max/Min of Base		161													

Depending on which months you select, the monthly adjustment could **vary** by as much as this, FOREVER

Note that the MLC Base Factor (uplift percent) is different for every product….

Country Multiplex Pricing

Some observations:

- You can get the CMLC MSUs for *previous* months by re-running SCRT jobs with the Country_Multiplex_Pricing option specified. But you need to be able to determine the *price* of the Base MSUs in order to calculate the MLC Base Factor.

- To give you some idea of what other customers are seeing, we have seen MLC Base Factors as high as >50%, and as low as <1%.
  - The larger numbers are typically for installations with multiple priceplexes.
  - The smaller numbers are from installations where the CPCs are maxed out, running at the caps or machine capacity for large amounts of time, thereby forcing the AWLC and CMLC MSUs closer together.

- For a *growing* site, CMP should deliver savings over time. For a *shrinking* site, CMP will increase costs above what they would have been. But if you are shrinking, *don't* automatically think that CMP is not for you – the technical benefits might be worth the additional cost. Identify the cost and make an informed decision.

- From a technical perspective, we think that CMP is a great thing for most customers. But, don't let IBM rush you into signing up for CMP – make sure that you understand the process, and your historic seasonal changes in MSUs/Costs – then pick the 3 months that make sense for *you*.

Container Pricing

The latest buzz in the IBM SW pricing world is container pricing.

This was previewed as part of the z14 announcement in July 2017.

There are two aspects to container pricing:

- Infrastructure enhancements in z/OS and related products, to make the management of pricing options easier and more transparent.

- New pricing options:
  - DevTest Container
  - New Application Solution Container
  - Payments Processing Solution Container

- We have a full session (23516) about Container Pricing tomorrow at 16:30 in Room 105. **Andrew Sica** also has a session (23523) tomorrow, at 15:15 in the same room. Come to both, and see if you can *contain* your excitement! ☺

Container Pricing

In this session, we are going to focus on the most popular pricing option – the DevTest container.

Like every pricing option, you should determine:

- How much would it cost me?
- What would the cost of the alternative be?
- Are there benefits beyond the potential $ savings?

Container Pricing

To grossly over-simplify it, the DevTest container option fixes the MLC cost of your development and test workload at whatever it costs you today – so you can plan out into the future, knowing precisely what it will cost you.

IBM says that you can grow the DevTest workload significantly from where it is today, at zero additional MLC cost (apart from the normal annual price increases).

That's a half truth! You can grow the DevTest workload at zero additional MLC cost, but there could be an increase in the MLC cost of production if the CPU utilization is increased. And there could be an increase in the IPLA costs.

Container Pricing

Sounds too good to be true?

The Gotcha is that you have to purchase sufficient Value Units NOW for any IPLA products used by the container to cover the *maximum* agreed size of the container.

- AND you get to pay S&S for those now, even though you might not grow into them for many months or years.

However, to be fair, if you license your IPLA products at full capacity, then this requirement probably will not make any difference.

- Make sure that the Container Pricing contract specifically states that you will not need to purchase more VUs than are required for the size of your CPC.

If you license your IPLA products based on sub-capacity, then you will almost definitely need to purchase additional VUs.

Container Pricing

INFLUENCE

We can accurately predict the cost of the MLC products in the Container, using the same mechanism that IBM uses (multiple SCRT runs):

- We can tell you how many additional VUs you would need to purchase.
- We can tell you what the approximate cost of those LPARs would be if you did NOT sign up for DevTest, in both growing and shrinking scenarios.
- We can tell you the pros and cons of selecting 1X, 2X, or 3X for the maximum.

NOW you are positioned to make the best decision for your company.

And now for something different…

A common example – 'downsizing' applications

- Who has NOT had to deal with someone proposing to reduce costs by moving a workload off the mainframe? "This accounts for 20% of our MIPS, so if we move it to **_insert_flavor-of-the-day_platform_**, then we will reduce our costs by 20%!"

- For a start, is the target platform *free*? If not, the savings are not 20%.

- Is the application using 20% of the MIPS <u>on the entire platform</u> *at the time of the peak R4HA*?
  - Maybe, maybe not.
  - So, the first step is to determine where the application is running, and how much capacity it is actually using at the peak R4HA for each product – this will allow us to do an accurate projection of the impact on the SW bill if that application no longer existed on z/OS. **IF the application doesn't run during your peak R4HA, its contribution to your MLC costs is zero**.
  - Also want to determine if that application is the only user of some product? If yes, that product can be removed and some costs saved. But if not, product must remain.

Another example – 'downsizing' applications

- IF the application *is* using 20% of every z/OS LPAR, how much would reducing the peak R4HA MSUs by 20% save?

- IT DEPENDS on many things - use of capping, latent demand, is the application using MWP/zCAP/zNALC, and so on.

- Having determined all that information, we can use the Growth Planner to tell you the actual impact on your SW bill if the application is moved.
  - Remember that the change to your bill will *always* be smaller than the MSU change – this applies to both increases and decreases.
  - Don't forget that reducing your MSUs has the effect of moving your incremental MSUs back towards the more expensive end of the pricing curve, meaning that the *average* price per MSU for all remaining applications will increase.
    - Conversely, growing your MSUs will move your incremental MSUs toward the cheaper part of the pricing curve, decreasing the average price per MSU for all workloads.
  - Note that if you have already migrated to CMP, the CMP adjustment will *not* decrease just because you decreased your MSUs by x%.
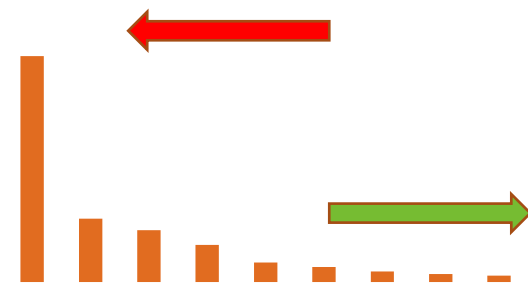
Another example – Optimizing your TUP Discount

- One of the incentives that IBM offers to customers moving to a newer CPC technology is a Technology Update Pricing (TUP) discount off your IBM MLC software bill.

- The amount of the discount depends on the CPC type (z13, z14, etc), and the total installed number of MSUs.

Total MSUs	zEC12 (TU1)	z13 (TU3)	z14 (TU5)
4 – 45 MSUs	2 %	4 %	6 %
46 – 315 MSUs	4 %	8 %	12 %
316 – 1315 MSUs	4.5 %	9 %	14 %
1316 – 2676 MSUs	5 %	10 %	15 %
2677 – 5476 MSUs	6 %	12 %	18 %
5477 – more MSUs	7 %	14 %	21 %

Another example – Optimizing your TUP Discount

- If your target CPC is close to one of the thresholds, you should look at the cost of alternative models that would put you over the threshold, and determine if the larger TUP discount would pay for the additional capacity.

- We can tell you the impact of the larger TUP discount, based on your actual usage and costs today.

  - We can also take into account the additional purchase and S&S costs for IPLA VUs.

CPC Upgrades – Be Adventurous!

- There are many scenarios where you have a wide choice of CPCs that will deliver roughly similar capacity.
  - The z14 and z14 ZR1 ranges overlap between 256 MIPS all the way up to 8036 MIPS. There are 200 (!) models within that range.
- ZR1s have the same capability as larger z14 models (they have the same firmware and even use the same chips as the larger z14 models). The main differences are in the areas of maximum capacity, upgradability (ZR1s cannot be MESed to z14s), the maximum number of general purpose CPs, and availability features.
- IF you can live with either machine from a technical perspective, don't automatically rule out one type without at least checking it first.

An example – HW vs SW costs

- One of our customers, NASCO, recently upgraded from a z13 709 (12,371 Average RNI MIPS) to a z14 523 (12,584 Average RNI MIPS).

- Following the upgrade and configuration optimization, their peak R4HA MSUs dropped by 22%!
  - **NOTE: NOT EVERYONE WILL ACHIEVE THE SAME RESULTS**.

- It is well known that additional capacity reduces the MSUs to do a given amount of work. (See USAA's experience in *Tuning Letter 2015 No. 4* and **Todd Havekost**'s SHARE presentations on "*Achieving CPU (& MLC) Savings Through Optimizing Processor Cache*" for more info.) This example shows what can be achieved by just having more CPs and more cache.

- Wouldn't it be nice to be able to put a dollar amount on how your SW bill would change for a given expected change in MSUs?
  - Then you could identify the sweet spot – what is the largest net savings you can make when upgrading CPCs?

Another example – HW vs SW costs

- SCRTPro shows you your actual SW costs for each month.
- But you can also use its What If capabilities to determine the financial impact of increasing or decreasing MSU consumption – in this example, a 22% drop in MSU consumption would decrease the monthly bill by $105K – a savings of 13.5%.

A	B	C	M	R	S	T	U	V	W	X
Growth Planner for Multiplex			... Feb 2017		Growth Plan				Growth Result	
CPC Highest 4HRA MSUs [SCRT Sect N5]			2581							
MLC Products	**Product ID**	**Lic Type**	**Average MSUs**	**+ Growth %**	**MSU Increase**	**MSU Total**	**New Disc %**	**MLC Increase**	**MLC Total**	**MLC Incr %**
				-22.0%			8.4%	-$ 105,164.13	$ 674,351.92	-13.49%
z/OS V2 (Traditional)	5650-ZOS	CMLC	2369	-22.0%	-521	1848	8.4%	-$ 21,785.26	$ 211,563.11	-9.34%
z/OS V2 DFSMS dsshsm	5650-ZOS	CMLC	2369	-22.0%	-521	1848	8.4%	-$ 2,299.27	$ 18,539.25	-11.03%
z/OS V2 DFSMS rmm	5650-ZOS	CMLC	2369	-22.0%	-521	1848	8.4%	-$ 1,083.33	$ 8,810.24	-10.95%
z/OS V2 DFSORT	5650-ZOS	CMLC	2369	-22.0%	-521	1848	8.4%	-$ 539.28	$ 2,781.53	-16.24%
z/OS V2 SDSF	5650-ZOS	CMLC	2369	-22.0%	-521	1848	8.4%	-$ 625.18	$ 5,459.42	-10.27%
z/OS V2 C/C++ without Debug	5650-ZOS	CMLC	654	-22.0%	-144	510	8.4%	-$ 816.49	$ 5,568.35	-12.79%
z/OS V2 Infoprint Server	5650-ZOS	CMLC	706	-22.0%	-155	551	8.4%	-$ 508.99	$ 4,645.94	-9.87%
non-z/OS (CMLC)										
CICS TS for z/OS V5	5655-Y04	CMLC	2343	-22.0%	-515	1828	8.4%	-$ 32,370.80	$ 172,724.49	-15.78%
DB2 11 for z/OS	5615-DB2	CMLC	2343	-22.0%	-515	1828	8.4%	-$ 28,658.21	$ 150,930.35	-15.96%
IBM MQ for z/OS V8	5655-W97	CMLC	2155	-22.0%	-474	1681	8.4%	-$ 13,967.70	$ 72,072.83	-16.23%
Tivoli NetView for z/OS V6	5697-NV6	CMLC	2370	-22.0%	-521	1849	8.4%	-$ 1,879.12	$ 9,983.42	-15.84%
IBM Enterprise Cobol for z/OS V4	5655-S71	CMLC	207	-22.0%	-46	161	8.4%	-$ 630.52	$ 5,403.73	-10.45%
FLAT (Flat)										

Report Notes | **Growth Planner** | MSU Summary | CPC01 | CPC02 | CPC03 | MLC Summary | Aug 2016 mlc

SW Stack Cost and Utility LPARs

- Remember that, generally speaking, products are charged based on the size of the LPARs they are running in.

- Therefore, the more work you cram into an LPAR, the larger it gets, and the more you pay for *everything* in the LPAR.

- In other words, the $ per MSU for a given LPAR is related to the number of products running in that LPAR.
  - If you have an LPAR with CICS, DB2, IMS, MQ, and z/OS, the $/MSU will be a lot more than an LPAR running only z/OS.

- Let's say that you have an inexpensive product using 400 MIPS in a LPAR - do you care how many MIPS it uses? YES! Because the R4HA for *every* product in that LPAR will include those 400 MIPS.

- To try to control costs, some of our customers are now using "Utility LPARs".

- These are LPARs with a minimal SW stack, mainly for batch jobs and TSO users that don't need the major subsystems.

SW Stack Cost and Utility LPARs

- Let's look at an example. Here, we compare the cost of one 500 MSU LPAR running everything, with two 250-MSU LPARs, where one runs the minimal software stack, and the other runs everything.

- The $/MSU in the first case is $1137.

- The $/MSU in the second case are $1397 for the Full LPAR and $326 for the Utility LPAR

- In this example, the total cost would reduce from $568K to $431K – a saving of $157K per month.

z/OS V2 (Traditional)	5650-ZOS	AWLC	500	$ 129,944.82			z/OS V2 (Traditional)	5650-ZOS	AWLC	500	$ 129,944.82
z/OS V2 DFSMS dsshsm	5650-ZOS	AWLC	500	$ 10,383.92			z/OS V2 DFSMS dsshsm	5650-ZOS	AWLC	500	$ 10,383.92
z/OS V2 DFSMS rmm	5650-ZOS	AWLC	500	$ 5,324.57			z/OS V2 DFSMS rmm	5650-ZOS	AWLC	500	$ 5,324.57
z/OS V2 SDSF	5650-ZOS	AWLC	500	$ 3,515.96			z/OS V2 SDSF	5650-ZOS	AWLC	500	$ 3,515.96
z/OS V2 C/C++	5650-ZOS	AWLC	500	$ 6,141.25			z/OS V2 C/C++	5650-ZOS	AWLC	250	$ 4,063.80
z/OS V2 Security Server	5650-ZOS	AWLC	500	$ 8,035.12			z/OS V2 Security Server	5650-ZOS	AWLC	500	$ 8,035.12
z/OS V2 RMF	5650-ZOS	AWLC	500	$ 5,779.70			z/OS V2 RMF	5650-ZOS	AWLC	500	$ 5,779.70
non-z/OS (AWLC)							non-z/OS (AWLC)				
CICS TS for z/OS V5	5655-Y04	AWLC	500	$ 85,497.41			CICS TS for z/OS V5	5655-Y04	AWLC	250	$ 57,773.41
DB2 11 for z/OS	5615-DB2	AWLC	500	$ 74,707.25			DB2 11 for z/OS	5615-DB2	AWLC	250	$ 49,919.00
DB2 QMF Classic Edition V11	5615-DB2	AWLC	500	$ 23,168.03			DB2 QMF Classic Edition V11	5615-DB2	AWLC	250	$ 11,534.00
IMS Transaction Mgr V14	5635-A05	AWLC	500	$ 90,717.45			IMS Transaction Mgr V14	5635-A05	AWLC	250	$ 60,868.05
IMS Database Mgr V14	5635-A05	AWLC	500	$ 76,906.01			IMS Database Mgr V14	5635-A05	AWLC	250	$ 51,824.36
IBM MQ for z/OS V9	5655-MQ9	AWLC	500	$ 37,456.29			IBM MQ for z/OS V9	5655-MQ9	AWLC	250	$ 24,716.59
Enterprise COBOL for z/OS V6	5655-EC6	AWLC	500	$ 11,059.73			Enterprise COBOL for z/OS V6	5655-EC6	AWLC	250	$ 7,259.73
		Total / Mth		$ 568,637.51					Total / Mth		$ 430,943.03
		Average $/MSU		$1,137.28					Utility LPAR $/MSU		325.97
									Full LPAR $/MSU		1397.80

SW Stack Cost and Utility LPARs

- This is not a trivial exercise:
  - There are so many variables, the answer will be different for every site.
  - You would need to determine how much work can be moved to the utility LPAR.
  - You need to factor in the additional overhead (MIPS, Memory, administration, and management) for running a second z/OS LPAR.
  - Also, you need to factor in the potential for reduced CPC cache efficiency.

- However, without knowing the approximate $ savings that could be achieved (as shown on the previous chart), you really are not in a position to make a good determination about whether this change would be cost effective or not.

- There may be other 'lower-hanging fruit' that would be easier to implement. But if they are all gone, this is a strategy that has been successfully implemented by a number of medium-to-large sites.

Hidden gems…

- IBM recently delivered PTFs for a load of DB2 and IMS tools. The PTFs provide the ability to make some of their processing zIIP-eligible – YEAH!

- However, the function is turned OFF by default. Boo – well, maybe…
  - There is a CPU cost for the product to create the enclave that will be used for the zIIP work – thanks to **Kathy Walsh** for this tip. Unfortunately, the PTFs don't say anything about this.

- In one case, if you search hard enough, you will discover that you turn on the zIIP support by including a "`//AUIZIIP DD DUMMY`" statement in the JCL of the associated started task.
  - WHAT??!!   Are they serious??!!

- This is just one example of the valuable information that can be obtained by reviewing IBM APARs.
  - The only problem is that there are a LOT of them, and they are not always flagged in a manner that guarantees that you will find them.
  - Or, if you are a Tuning Letter subscriber, check out the Performance section in the News article in every Tuning Letter – we read all the APARs so that you don't have to.

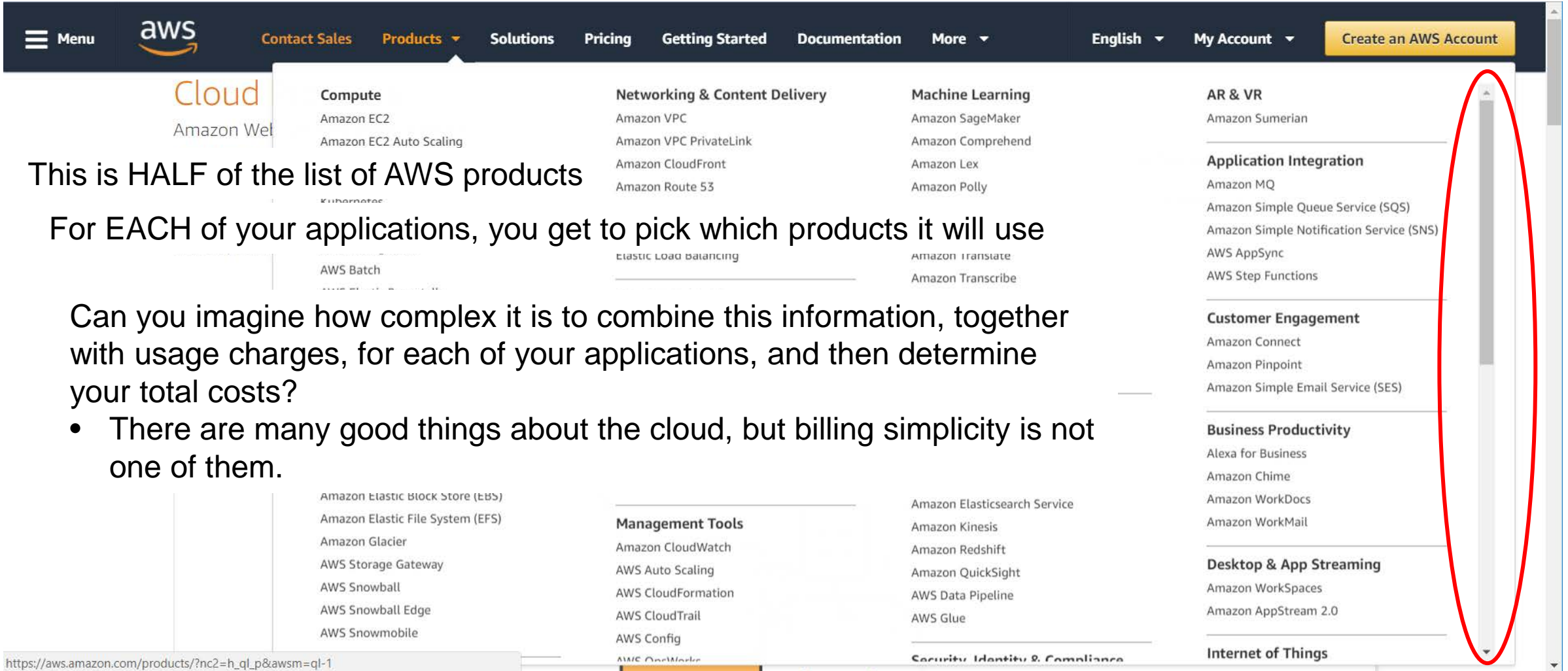# Contract reviews

We review a lot of contracts

- IBM contracts/agreements/addendums
  - ELA/ESSO
  - Country Multiplex
  - Container Pricing
- ISV contracts
  - We know which ISVs will provide sub-capacity contracts
- Outsourcing contracts

Contract reviews

Things we find wrong:

- Incorrect or no definition of terms like MIPS or MSUs.
- If using SCRT MSUs, which ones – N5 (bad) or P5 (good).
- References to non-existent tables and charts.
- No limit on how far back an audit can go.
- Use of full-cap instead of sub-capacity charging.
- Dependence on language from 20 years ago.
- No penalty if non-performing.
- Ambiguity on measurements, peaks, etc.

Is Cloud *Really* the Answer to World Hunger?

This is HALF of the list of AWS products

For EACH of your applications, you get to pick which products it will use

Can you imagine how complex it is to combine this information, together with usage charges, for each of your applications, and then determine your total costs?
- There are many good things about the cloud, but billing simplicity is not one of them.

The Reality of cloud billing
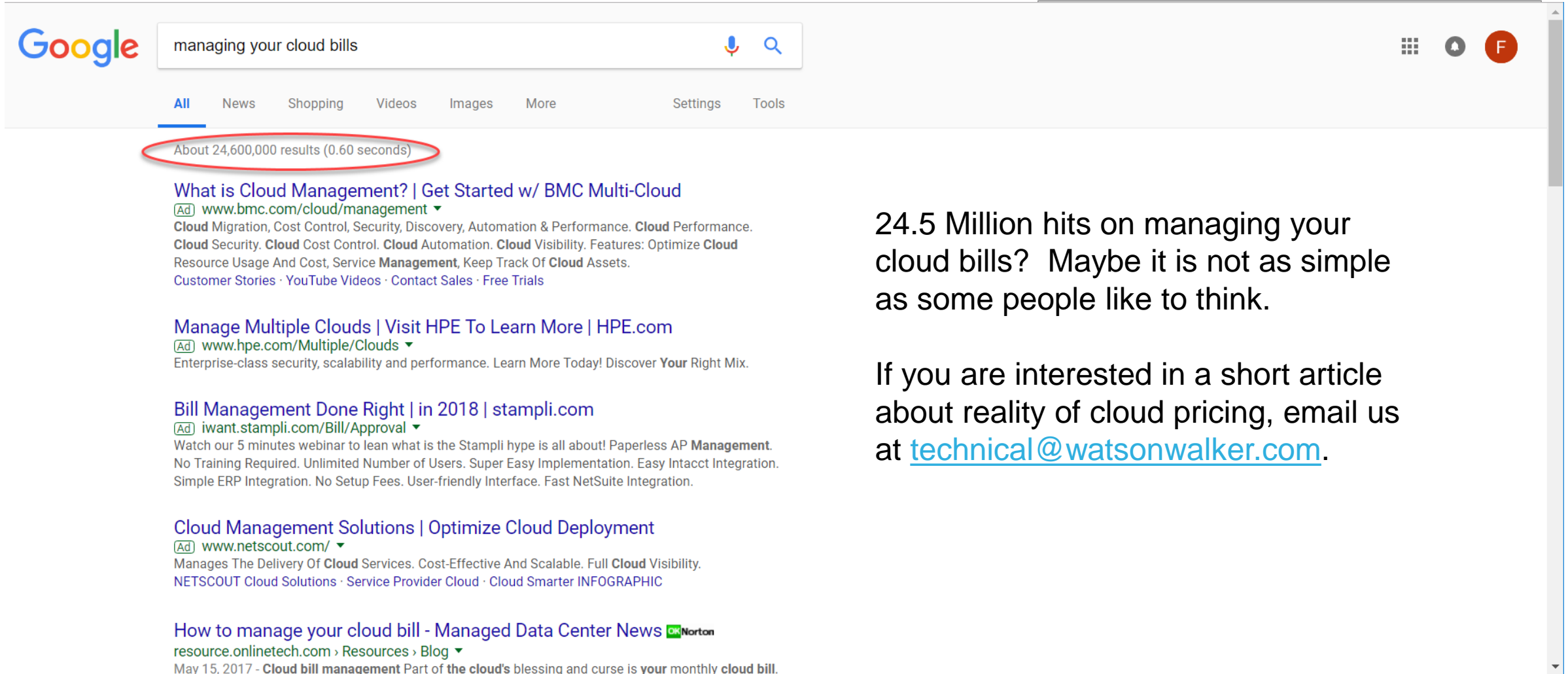
24.5 Million hits on managing your cloud bills? Maybe it is not as simple as some people like to think.

If you are interested in a short article about reality of cloud pricing, email us at technical@watsonwalker.com.

What Is SCRTPro?

- What do we offer:
  - On-site, single-customer, SW Pricing class.
  - Assistance with preparing for CMP.
  - Evaluation of Container Pricing offering.
  - Contract reviews.
  - Preparation for ELA negotiations.
  - Full SCRTPro monthly consulting service.

Summary

- No one can optimize your environment as well as you can – because you know it better than anyone else.

- However, just as you need performance specialists to manage your performance, you also need software pricing specialists to manage your costs. *Very* few companies have staff that are dedicated to understanding software pricing options – it is usually a responsibility dumped on some poor unfortunate that is already overloaded.

Summary

- Software cost optimization is what we do. We help customers:
  - Understand their software bills.
  - Audit-proof themselves.
  - Review your contracts and highlight any exposures.
  - Identify the right 'tool' to reduce your software costs.
  - Stay abreast of the latest software pricing options, and identify ones that would benefit them.
  - We help clients model the financial impact or adding or removing workloads or products, moving to a different CPC, and preparing for CMP and Container Pricing.
- If you would be interested in an on-site class on this topic, see here for the class description.
- Let Watson & Walker be your independent, respected, trusted advisors. If you would like more information, talk to us this week, or email us at admin@watsonwalker.com.

z End

If you have any questions, suggestions, comments, or general abuse, please email us at technical@watsonwalker.com

Don't forget our session 23516 on Container Pricing, at 16:30 tomorrow.

Thank you for coming, and please complete the online evaluation!